

REMARKS

The last Office Action has been carefully considered.

It is noted that the oath or declaration is defective, and a new oath or declaration is required.

Claim 5 is rejected under 35 U.S.C. 112.

Claims 4-6 are rejected under 35 U.S.C. 103(a) over the U.S. patent to Kim in view of the PCT publication to Seki.

U.S. patent to Vanmoor and U.K. patent application publication to Helmi.

Claims 4 and 5 are rejected under 35 U.S.C. 103 over the PCT publication to Seki in view of the U.S. patent to Van Moore.

In connection with the Examiner's objection to the declaration, a new declaration is submitted herewith the signatures of the inventors. In connection with the Examiner's rejection of claim 5, claim 4

has been amended and therefore it is believed that the language of claim 5 is now clear.

The blade extends from the hubs in a direction away from the shaft, and it is believed that this orientation is clear with respect to the language of claim 5.

In view of the above, it is believed that the Examiner's grounds for the formal objections and rejections are eliminated.

Turning now to the Examiner's grounds for the rejection of the claims and in particular to the U.S. patent to Kim, it is submitted that the Examiner stated that this reference disclose a device A comprising a shaft (drive shaft of engine 21); at least two hubs arranged on said shaft and blades fixed on each of said hubs uniformly over a circumference (propeller 3). The Examiner's statement in its major part is correct, however, this reference does not disclose the feature of "blades fixed on each of said hubs uniformly over a circumference". The patent to Kim also fails to teach blades having sharp front and rear edges that have a thickness of $(0.10-0.25) b$, where b is chord length, and they are twisted relative to an axis extending through the middle of the blade. Thus, this reference does not teach the new features of the present invention as defined in claim 4.

The Examiner stated that the Seki publication (referred to as U.S. patent no. 6,974,309) teaches a blade with a thickness of between 20-25% of the chord length (column 10, lines 47-51) where the maximum thickness occurs in the middle of the blade chord (column 5, line 60).

In the Seki reference, (column 10, lines 47-51) it is really stated that a blade has a thickness of between 20-25 % of the chord length, there is not about the place of location of the maximum thickness of the profile. It is stated that this reference (column 5, line 60) that "when the blade center is 50%, a line radially extended from the shaft crosses the blade chord line at the middle of the chord length". This statement has nothing to do with choosing of profile of a blade relative to the line extending through a center of a shaft, it does not correspond to the feature that the applicant chooses an appointed size of profile of the blade and does not deal with the displacement relative to the hub. Furthermore, the Seki reference deals with a straight blade type turbine with one chamfered front edge and one sharp back edge, while to the contrary in the applicant's invention both edges are sharp. Thus, this reference also does not teach the new features of the present invention as defined in claim 4.

The Van Moore reference discloses a blade twisted (Figure 2) relative to an axis extending through the middle of the local chords.

This reference also teaches that sharp edges (column 6, lines 11-14) on blades increases efficiency. Figures 2 and 3 of this reference show a single sinusoidal and tangential blades (column 3, line 58-62), but not blades which are twisted relative to an axis extending to the middle of the vocal chords. In this reference the sharp edges are suggested especially sinusoidal or tangential profiles to increase effectiveness of high-speed propellers. In contrast, in the applicant's invention the sharp front and back edges are configured for profiles with rectilinear mean line respective of speed of rotation of propellers.

The Examiner indicated that the present invention as defined in claim 4 could be considered as obvious from the above discussed three references. Applicant has to respectfully disagree with this position for the following reasons.

As stated in *Arkie Lures, Inc. v. Gene Larew Tackle, Inc* (43 USPQ 2d 1294, 1296 Fed. Cir. 1997):

"it is insufficient to establish obviousness that the separate elements of the invention existed in the prior art, absent some teaching or suggestion in the prior art to combine the references."

Definitely, the references do not have any hint or suggestion for their combination and therefore it is believed that it is not justified to combine the references.

Also, the present invention can not be derived from the references. In order to arrive at the present invention as defined in claim 4 from the references, the references have to be fundamentally modified. However, it is known that in order to arrive at a claimed invention, by modifying the references cited art must itself contain a suggestion for such a modification.

This principle has been consistently upheld by the U.S. Court of Customs and Patent Appeals which, for example, held in its decision in re Randol and Redford (165 USPQ 586) that

Prior patents are references only for what they clearly disclose or suggest; it is not a proper use of a patent as a reference to modify its structure to one which prior art references do not suggest.

In view of the above presented remarks and amendments, it is believed that the broadest claim on file, should be considered as patentably over the Kim, Seki, and Van Moore reference, as well as over the Seki and Van Moore reference as applied by the Examiner.

Claim 4 should be considered as patentably distinguishing over the art and should be allowed.

As for claim 5, the Examiner stated that the Kim reference that while this reference did not teach blades fixed on the hubs inclinedly in a direction opposite to a direction of rotation, this reference teaches changing the blade angle (Figure 5) to both positive and negative values with the negative values making the blade rotated opposite to the direction of rotation. After careful consideration of this reference, it should be stated that in column 4, lines 61-65, it is stated that:

“As illustrated in Figures 4A, 4B, and 4C, the blade angle is indicated by an angle α , between a line 18 and a blade chord 11, where the line 18 is perpendicular to the radially imaginary line and the blade cord line 11 inclines toward or outward relative to the line 18”.

Here each blade 3 is fixed to two struts 4. This is the angle of the blade created by turn of the blade 3 relative to the point of the intersection of line 22 and chord 18. In contrast, in the applicant's invention the blades are fixed on each of the hubs separately (but not on two hubs) uniformly or circumferences or inclinedly in direction opposite to a direction of rotation (but not with turn of the blade). With respect to paragraph 10 of the rejection, it is stated that regarding claim 6, the Kim reference teaches a cylindrical casing (barrel “A”) increasing the efficiency of the propeller (column 3, lines 38-45). This reference fails to

explicatedly teach, extending the casing in front of the hubs of a blade (Figure 1). It is stated that the Helmi reference teaches a cylindrical casing that extends past the front hub by the length of blade (Figure 1).

After careful consideration of the text of the Helmi reference, it can be seen that there are no features of "cylindrical casing" that extends past the front hub by the length of a blade "in it".

With respect to paragraphs 11, 12 of the rejection, it is stated that as to claim 4 the Seki reference teaches a propeller (turbine 1) compressing a shaft 2, at least two hubs (struts 4) arranged on the shaft, blades 3 fixed in each of the hubs uniformly over a circumference of Figure 1, each of the blades with the maximum thickness of profile (0.10-0.25) b wherein b is the length of a local chord of the blade (column 10, lines 47-51), and being twisted relative to an axis extending through a middle of said local chords along said extension of said blade (mean line 9, column 3, lines 61-66), wherein said maximum thickness of said profile is located in the middle of each of said local chords (column 5, line 60). The analysis of this reference shows that in the reference:

(A) the feature of "blades 3 fixed on each of said hubs uniformly over a circumference" is not disclosed. In the Seki reference

each blade 3 is fixed on two hubs (struts 4) but not on one hub as in the applicant's invention.

(B) the feature of a "maximum" thickness of profiles (0.10-0.25) b wherein b is a length of local chord of said blank (is not disclosed in the reference;

(C) each of said blades being twisted relative to an axis extending through a middle of said local chords along said extension of said blades is not in the reference.

(D) the feature that "each of said blades being twisted relative to an axis extending to a middle of said local chords along said extension of said blade" is not provided in this reference.

A mean line of the profile is a line connecting front and back points of the profile and going through middle of segments between upper and lower parts of the profile. The feature "mean line of a profile" does not relate to twisting of the blade and this contrasting is wrong.

The patent to Tsei??? does not teach a blade with a sharp front edge. Finally, paragraph 3 with respect to paragraph 13 of the rejection the Vanmoore reference teaches sharp edges (3, 4) on the

blades to increase efficiency and reduce aerodynamic drag on the blades (column 1, lines 30-45 and column 2, lines 22-27).

Definitely, the blades with sharp front and back edges are known. However, the combination of the new features of the present invention as defined in claim 4 is not known.

Finally, with respect to paragraph 14, the Examiner stated that a propeller as defined in claim 4, Seki teaches blades that are fixed on each of said hubs inclinedly in a direction opposite to a direction of rotation (Figure 6). Thorough consideration of the Seki reference clearly shows that each blade 3 is fixed to two struts 4, but to one hub as in the present application. In the Seki reference the angle of a blade is provided by a turn of blade 3 relative to point of intersection of line 22 and chord 18, but in contrast in the applicant's invention it is inclinedly in a direction opposite in an action of rotation. Thus, this feature is not disclosed in the reference.


As was shown herein above, the new features of the present invention as defined in claim 4 are not disclosed in the references and can not be derived from them.

The same is true with respect to the new features of the present invention as defined in claims 5 and 6. The features of these claims also are not disclosed in the references and can not be considered as obvious from the references, and therefore claims 5 and 6 should be considered as patentably distinguishing over the art not only because they depend on the allowable claim 4, but also because they contain the patentable subject matter.

Reconsideration and allowance of the present application is most respectfully requested.

Should the Examiner require or consider it advisable that the specification, claims and/or drawings be further amended or corrected in formal respects in order to place this case in condition for final allowance, then it is respectfully requested that such amendments or corrections be carried out by Examiner's Amendment, and the case be passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing this case to allowance; he is invited to telephone the undersigned (at 631-988-9010).

Respectfully submitted,



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